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# **Notice of Allowability**

Application No.

10/749,575

Examiner

Phuong Phu

Applicant(s)

CAPOFREDDI, PETER

Art Unit

2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the Response filed on 6/25/07.
2. ☒ The allowed claim(s) is/are 1-20.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All   b) ☐ Some\*   c) ☐ None   of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

## **Attachment(s)**

- |  |   |
|--|---|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892)   | 5. <input type="checkbox"/> Notice of Informal Patent Application                     |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 6. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____ |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),<br>Paper No./Mail Date _____    | 7. <input type="checkbox"/> Examiner's Amendment/Comment                              |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance  |
|  | 9. <input type="checkbox"/> Other _____   |

### **DETAILED ACTION**

1. This Office Action is responsive to the Response filed on 6/25/07. Accordingly, claims 1-20 are currently pending.

### **REASONS FOR ALLOWANCE**

2. Claims 1-20 are allowed.
3. The following is an examiner's statement of reasons for allowance:

-Regarding independent claim 1, none of prior art of record teaches or suggests a method for spectrally shaping nonlinear intersymbol interference (NLISI) in an oversampling digital-to-analog converter causing energy associated with NLISI to fall outside a signal band, the method comprising procedures of receiving a multiple bit digital input signal in said signal band; providing a quantized representation of said multiple bit digital input signal; and changing said quantized representation based on a first order shaper circuit and at least one higher-order shaper circuit, thereby reducing NLISI energy level present in said signal band.

-Regarding independent claim 5, none of prior art of record teaches or suggests an oversampling multi-bit digital to analog converter for converting a multi-bit converter digital input to an analog converter output, comprising: a digital signal processor that spectrally shapes quantization noise using delta-sigma modulation, the digital signal processor comprising a first order shaper circuit for shaping quantization noise; wherein the digital signal processor comprises a multiport quantizer converting a plurality of multi-bit multiport inputs to a single-bit multiport output, and wherein the digital signal processor comprises at least one higher-order shaper circuit to spectrally shape nonlinear intersymbol interference.

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-Regarding independent claim 11, none of prior art of record teaches or suggests an oversampling digital-to-analog converter comprising: a first digital filter having a first digital filter input and a first digital filter output, said first digital filter being for filtering an input signal having a signal band; a second digital filter having a second digital filter input and a second digital filter output, said second digital filter being for filtering a quantized signal; a summing element having a summing element output, said summing element for summing said first digital filter output with said second digital filter output wherein said second digital filter and said summing element form a first order shaper circuit, said summing element being a first order bias signal; at least one higher-order shaper circuit, said at least one higher-order shaper circuit generating a higher-order bias signal, said higher-order bias signal indicating magnitude of a portion of nonlinear intersymbol interference (NLISI) falling in the signal band; a multiport quantizer having a plurality of multiport quantizer inputs and a multiport quantizer output, said plurality of multiport quantizer inputs comprising said first order bias signal and said higher-order bias signal; and a feedback loop for connecting said multiport quantizer output to said first digital filter input and to said at least one higher-order shaper circuit.


Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phuong Phu whose telephone number is 571-272-3009. The examiner can normally be reached on M-F (8:00 AM - 4:30 PM).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on 571-272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
Phuong Phu  
08/10/07

**PHUONG PHU**  
**PRIMARY EXAMINER**

Phuong Phu  
Primary Examiner  
Art Unit 2611